

BIOLOGICAL ANIMAL SCIENCE

Curriculum Content Framework

Prepared By

Deanna Bruce, Lonoke High School
Caramie Edwards, Springdale High School

Facilitated By

Karen Chisholm, Program Manager
Office of Assessment and Curriculum
Arkansas Department of Workforce Education

Edited By

Angela Collins, Program Advisor
Office of Agriculture Science and Technology
Arkansas Department of Workforce Education

Disseminated By

Career and Technical Education
Office of Assessment and Curriculum
Arkansas Department of Workforce Education

Curriculum Content Framework

BIOLOGICAL ANIMAL SCIENCE

Grade Levels: 10, 11, 12
Course Code: 491017

Prerequisites: Agriculture Science & Technology or Agriculture Science; Animal Science

Course Description: This course is a scientific approach to animal science using scientific principles and applied management practices. An emphasis on selection and industry review will be based on scientific data.

Table of Contents

	Page
Unit 1: Biological Sciences in Our Lives	1
Unit 2: Conducting & Reporting Experiments	6
Unit 3: Genetics & Heritability	9
Unit 4: Animal Reproduction	12
Unit 5: Digestion & Nutrition.....	16
Unit 6: Animal Health	22
Unit 7: Food Preservation	26

Unit 1: Biological Sciences in Our Lives

10 Hours

Terminology: Biological engineering

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
1.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6]
1.2 Identify ways in which biological sciences affect our everyday lives	1.2.1 Collect magazine and newspaper articles related to the topic	Foundation	Reading	Adjusts reading strategy to purpose and type of reading (skimming and scanning) [1.3.1] Applies information and concepts derived from printed materials [1.3.3] Draws conclusions from what is read [1.3.12]
		Thinking	Creative Thinking	Uses imagination to create something new [4.1.1] Develops visual aids to create audience interest [4.1.4] Makes connections between seemingly unrelated ideas [4.1.6]
1.3 Analyze the misconceptions about biological engineering	1.3.1 Present to the class a misconception that occurred in biological engineering	Foundation	Reading	Comprehends written information for main ideas [1.3.7] Distinguishes between fact and opinion [1.3.11]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
1.3 (Continued)			Speaking	Evaluates written information for accuracy, appropriateness, and style [1.3.14]
				Identifies inaccurate information/entries on written documents [1.3.15]
				Adapts presentation to audience [1.5.1]
				Organizes ideas and communicates oral messages to listeners [1.5.7]
				Participates in conversation, discussion, and group presentation [1.5.8]
				Pronounces words correctly [1.5.9]
		Interpersonal	Cultural Diversity	Recognizes differences among team members [2.2.3]
		Thinking	Reasoning	Respects others' personal values, cultures, and traditions [2.2.4]
				Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
1.4 List career opportunities available in biological sciences	1.4.1 Research a career in the biological sciences to determine educational requirements, working conditions, and salary	Foundation	Writing	Applies rules of grammar, punctuation, capitalization, and spelling [1.6.3] Checks, edits, and revises document for correct information, appropriate emphasis, form, grammar, spelling, and punctuation [1.6.5] Evaluates written information for appropriateness/content/clarity [1.6.9]
		Personal Management	Career Awareness, Development, & Mobility	Develops skills to locate, evaluate, and interpret career information [3.1.4] Explores career opportunities [3.1.6] Identifies continuing changes in male/female roles at home and work [3.1.7] Identifies education and training needed to achieve goals [3.1.8]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
1.5 Discuss FFA opportunities for students interested in biological sciences		Foundation	Listening	Evaluates oral information/presentation [1.2.2]
				Listens for content [1.2.3]
		Personal Management	Speaking	Listens for long-term contexts [1.2.7]
				Asks questions to clarify information [1.5.3]
				Asks questions to obtain information [1.5.4]
				Analyzes impact of work on individual and family life [3.1.1]
				Monitors progress toward goal attainment [3.1.10]
				Sets well-defined and realistic personal/career goals (short-term and long-term) [3.1.11]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
1.6 Identify SAE opportunities for students interested in biological sciences		Foundation	Listening	Evaluates oral information/presentation [1.2.2] Listens for content [1.2.3] Listens for long-term contexts [1.2.7]
			Speaking	Asks questions to clarify information [1.5.3] Asks questions to obtain information [1.5.4]
		Personal Management	Career Awareness, Development, & Mobility	Analyzes impact of work on individual and family life [3.1.1] Monitors progress toward goal attainment [3.1.10] Sets well-defined and realistic personal/career goals (short-term and long-term) [3.1.11]

Unit 2: Conducting & Reporting Experiments

10 Hours

Terminology: Conclusion, Control group, Dependent variable, Experiment, Findings, Hypothesis, Independent variable, Manipulation, Procedure, Recommendation, Replication, Treatment

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
2.1 Define terms associated with experimentation		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6] Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
		Thinking	Knowing how to Learn	Develops personal learning strategies—note taking, clustering related items, flash cards, etc. [4.3.2] Locates appropriate learning resources to acquire or improve knowledge and skills [4.3.3]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
2.2 List the steps in conducting experimental research		Foundation	Science	Applies/Uses scientific method [1.4.7] Describes/explains scientific principles related to research [1.4.14]
		Thinking	Problem Solving	Comprehends ideas and concepts related to scientific research [4.4.1] Draws conclusions from what is read, and gives practical solutions [4.4.3]
2.3 Explain how the research process is applied to lab and field experiments	2.3.1 Conduct a simple experiment	Foundation	Science	Applies knowledge to complete a practical task [1.4.3] Applies a scientific principle to solve a problem [1.4.8] Applies/Uses the scientific method [1.4.6] Constructs a hypothesis [1.4.10]
		Interpersonal	Teamwork	Contributes to group with ideas, suggestions, and effort [2.6.2] Works effectively with others to reach a common goal [2.6.6]
		Personal Management	Integrity/Honesty/Work Ethic	Complies with safety and health rules in a given work environment [3.2.2]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
2.4 List the major parts of a research paper	2.4.1 Prepare a research paper on the experiment	Foundation	Writing	Records data [1.6.16] Summarizes written information [1.6.17] Writes appropriate entries [1.6.22]
		Thinking	Seeing Things in the Mind's Eye	Imagines the flow of work activities from narrative descriptions [4.6.1] Visualizes a finished product [4.6.4]
2.5 Explain the difference between findings, conclusions, and recommendations		Foundation	Writing	Communicates thoughts, ideas, or facts in written form in a clear, concise manner [1.6.6] Presents answers/conclusions in a clear and understandable form [1.6.13]
		Personal Management	Responsibility	Exhibits enthusiasm in approaching and completing tasks [3.4.3] Sets high standards for self in completion of a task [3.4.9]

Unit 3: Genetics & Heritability

15 Hours

Terminology: Allele, Chromosome, DNA, Dominant, Gamete, Gene, Genetics, Genotype, Heterozygous, Homozygous, Phenotype, Recessive

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
3.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to the subject [1.3.6] Identifies relevant details, facts, and specifications [1.3.16]
		Thinking	Reasoning	Extracts rules or principles from written information [4.5.4]
3.2 Explain the difference between genotype and phenotype and homozygous and heterozygous	3.2.1 Discuss Mendel's role in the study of genetics	Foundation	Reading	Applies/Understands technical words that pertain to the subject [1.3.6] Identifies relevant details, facts, and specifications [1.3.16]
		Thinking	Reasoning	Extracts rules or principles from written information [4.5.4]
3.3 Explain how characteristics of an animal are passed from one generation to the next	3.3.1 Create a model of DNA	Foundation	Science	Describes/Explains scientific principles related to heredity [1.4.13] Constructs model to depict basic concept of DNA [1.4.12]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
3.4 Analyze the genotypic and phenotypic ratio	3.4.1 Use a Punnett Square for a F1 and F2 cross	Foundation	Arithmetic/ Mathematics	Applies a mathematical formula to solve a problem [1.1.3] Calculates percentages, ratios, proportions, decimals, and common fractions [1.1.10] Constructs graphs/tables/charts [1.1.16]
		Thinking	Problem Solving	Comprehends ideas and concepts related to genetics [4.4.1] Draws conclusions from observations, evaluates conditions, and gives possible solutions [4.4.5] Tracks and evaluates results [4.4.10]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
3.5 Explain how genetic principles are used to improve agricultural production	3.5.1 Visit a crossbred cattle herd, and observe improvements resulting from the breeding program	Foundation	Listening	Comprehends ideas and concepts related to animal production [1.2.1] Listens for content [1.2.3] Listens to follow directions [1.2.6]
		Thinking	Reasoning	Applies rules and principles to a new situation [4.5.1] Sees relationship between two or more ideas, objects, or situations [4.5.5] Uses logic to draw conclusions from available information [4.5.6]

Unit 4: Animal Reproduction

15 Hours

Terminology: Copulation, Corpus luteum, Embryo transfer, Estrogen, Estrus, Follicle, Follicle stimulating hormone, Gestation, Hormone, Hybridization, Inbreeding, Ovulation, Oxytocin, Parturition, Progesterone, Selective breeding, Super ovulation, Testosterone, Zygote

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
4.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6] Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
		Thinking	Knowing how to Learn	Develops personal learning strategies—note taking, clustering related items, flash cards, etc. [4.3.2] Locates appropriate learning resources to acquire or improve knowledge and skills [4.3.3]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
4.2 Identify the parts of the male and female reproductive tracts	4.2.1 Label the parts of male and female reproductive tracts	Foundation	Reading	Applies/Understands technical words that pertain to the subject [1.3.6] Determines what information is needed [1.3.10] Interprets drawings to obtain factual information [1.3.17]
		Personal Management	Responsibility	Maintains a high level of concentration in completion of a task [3.4.7] Pays close attention to details [3.4.8] Sets high standards for self in completion of a task [3.4.9]
		Thinking	See Things in the minds eye	Visualizes a systems operation from schematics {4.6.3}
4.3 Describe the estrus cycle		Foundation	Science	Acquires and processes scientific data [1.4.1] Describes/ explains scientific data related to the estrus cycle [1.4.14]
		Thinking	Creative Thinking	Develops visual aids to create audience interest [4.1.4] Makes connections between seemingly unrelated ideas [4.1.6]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
4.4 Explain egg fertilization and cell division		Foundation	Science	Describes/Explains scientific principles related to cell division [1.4.14]
		Thinking	Seeing Things in the Mind's Eye	Organizes and processes images –symbols, pictures, graphs, objects, etc. [4.6.2.] Visualizes a system's operation from schematics [4.6.3]
4.5 Explain the processes of super ovulation and embryo transfer		Foundation	Reading	Applies information and concepts derived from printed materials [1.3.3] Applies information to new situations [1.3.5] Comprehends written specifications and applies them to a task [1.3.9] Interprets drawings to obtain factual information [1.3.17]
		Thinking	Creative Thinking	Finds new ways of dealing with existing problems/situations [4.1.5] Makes connections between seemingly unrelated ideas [4.1.6]

Unit 5: Digestion & Nutrition

15 Hours

Terminology: Anthelmintic, Antimicrobial, Carbohydrates, Cud, Finishing, Lactation, Lipids, Maintenance ration, Mineral, Monogastric, Nonruminant, Nutrient, Protein, Ration, Regurgitation, Ruminant, Rumination, Vitamin

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
5.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6] Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
		Thinking	Knowing how to Learn	Develops personal learning strategies—note taking, clustering related items, flash cards, etc. [4.3.2] Locates appropriate learning resources to acquire or improve knowledge and skills [4.3.3]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
5.2 Describe the six nutrients and their functions		Foundation	Writing	Communicates thoughts, ideas, or facts in written form in a clear, concise manner [1.6.6] Summarizes written information [1.6.17] Uses words appropriately [1.6.21]
		Thinking	Knowing how to Learn	Develops personal learning strategies—note-taking, clustering related items, flash cards, etc. [4.3.2]
5.3 Identify livestock as either ruminants or nonruminants		Foundation	Science	Applies knowledge to complete a practical task [1.4.3];
		Thinking	Problem Solving	Draws conclusions from observations, evaluates conditions, and gives possible solutions [4.4.5]
			Reasoning	Comprehends ideas and concepts related to animal digestion [4.5.2]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
5.4 Label and describe the functions of the parts of the ruminant and nonruminant digestive systems	5.4.1 Label diagrams of ruminant and nonruminant digestive tracts 5.4.2 Inspect ruminant and non-ruminant digestive tracts	Foundation	Reading	Applies/Understands technical words that pertain to the subject [1.3.6] Determines what information is needed [1.3.10]
			Science	Interprets drawings to obtain factual information [1.3.17]
		Personal Management	Responsibility	Follows safety guidelines [1.4.15] Maintains a high level of concentration in completion of a task [3.4.7] Pays close attention to details [3.4.8] Sets high standards for self in completion of a task [3.4.9]
		Thinking	Seeing Things in the Mind's Eye	Visualizes a systems operation from schematics {4.6.3}
5.5 Compare the differences between the way ruminants and nonruminants digest foods		Foundation	Science	Describes/Explains scientific principles related to digestion [1.4.13]
		Thinking	Decision Making	Comprehends ideas and concepts related to digestion [4.2.2]
			Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
5.6 Discuss the advantages and disadvantages of feed additives such as: antimicrobials, hormones, and anthelmintics		Foundation	Reading	Applies/Understands technical words that pertain to the subject [1.3.6] Draws conclusions from what is read [1.3.12]
			Speaking	Asks questions to clarify information [1.5.3] Asks questions to obtain information [1.5.4]
		Thinking	Decision Making	Considers risks when making a decision [4.2.3]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
5.7 Design a balanced feed ration	5.7.1 Use the Pearson Square method to balance a feed ration	Foundation	Arithmetic/ Mathematics	Calculates different units of measure [1.1.6] Calculates percentages, ratios, proportions, decimals, and common fractions [1.1.10] Enters figures/calculations from one form or chart to another [1.1.21] Uses calculator to solve mathematical problems [1.1.36]
			Reading	Uses graphs/tables/charts to obtain factual information [1.3.21] Uses standard occupational resource materials [1.3.22]
			Science	Applies knowledge to complete a practical task [1.4.3]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
5.8 Compare the differences in nutrition requirements for the following stages of life: maintenance, growth, finish, production, gestation, lactation, and work		Foundation	Reading	Applies/Understands technical words that pertain to the subject [1.3.6]
		Thinking		Draws conclusions from what is read [1.3.12]
			Problem Solving	Draws conclusions from what is read, and gives possible solutions [4.4.4]
			Reasoning	Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]

Unit 6: Animal Health

15 Hours

Terminology: Active immunity, Antibiotic, Bacteria, Colostrum, Disinfectant, Infectious disease, Intradermal, Intramammary, Intramuscular, Intrarumenally, Intravenous, Isolation, Mastitis, Noninfectious disease, Oral, Passive immunity, Pathogen, Protozoa, Sanitation, Stress, Subcutaneous, Topical, Vaccine, Virus

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
6.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6] Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
		Thinking	Knowing how to Learn	Develops personal learning strategies—note taking, clustering related items, flash cards, etc. [4.3.2] Locates appropriate learning resources to acquire or improve knowledge and skills [4.3.3]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
6.2 Identify temperature, respiration rate, and heart rate as the vital signs that indicate an animal's health status	6.2.1 Take the vital signs of an animal	Foundation	Reading	Determines what information is needed [1.3.10]
				Draws conclusions from what is read [1.3.12]
		Thinking	Arithmetic/ Mathematics	Calculates measures taken from measuring devices. [1.1.9]
			Science	Reads measurements from common measuring devices [1.4.20]
6.3 Describe and compare the different pathogens that cause diseases in animals		Foundation	Reasoning	Applies rules and principles to a new situation [4.5.1]
				Comprehends ideas and concepts related to animal health [4.5.2]
		Thinking	Science	Applies a scientific principle to solve a problem [1.4.8]
6.4 Describe environmental factors that affect animal health such as sanitation and stress		Foundation	Know how to Learn	Develops personal learning strategies—note taking, clustering related items, flashcards, etc. [4.3.2]
			Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
		Foundation	Science	Analyzes environmental issues (ecology, pollution, waste management) [1.4.2];
		Thinking	Problem Solving	Demonstrates logical reasoning in

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
				reaching a conclusion [4.4.2]
6.5 Describe how diseases and illnesses are prevented		Foundation	Writing	Applies/Uses technical words and concepts [1.6.4] Communicates thoughts, ideas, or facts in written form in a clear, concise manner [1.6.6] Evaluates written information for appropriateness/content/clarity [1.6.9]
		Thinking	Seeing Things in the Mind's Eye	Organizes and processes images –symbols, pictures, graphs, objects, etc. [4.6.2]
6.6 Identify injection types	6.6.1 Practice injecting using an orange and a clean needle	Foundation	Science	Follows safety guidelines [1.4.16] Observes health code/sanitation requirements [1.4.19]
		Personal Management	Responsibility	Exhibits enthusiasm in approaching and completing tasks [3.4.3] Maintains a high level of concentration in completion of a task [3.4.7] Pays close attention to details [3.4.8]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
6.7 Describe the types of immunity and how immunity can be improved		Foundation	Reading	Comprehends written information for main ideas [1.3.7] Constructs a graph of data [1.3.10] Constructs hypothesis [1.3.11]
		Thinking	Creative Thinking	Combines ideas or information in a new way [4.1.2] Makes connections between seemingly unrelated ideas [4.1.6]

Unit 7: Food Preservation

10 Hours

Terminology: Aerobic bacteria, Anaerobic bacteria, California Mastitis Test, Canning, Casein, Cheese, Coliform bacteria, Curd, Curing, Dehydration, E. coli bacteria, Fermentation, Irradiation, Microbes, Mold, Paraffin, Pasteurization, Penicillium, Perishable, Pickling, Putrefaction, Raw milk, Refrigeration, Rennet, Salmonella, Salting, Solids nonfat, Somatic cell count, Whey, Yeast, Yogurt

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
7.1 Define terms		Foundation	Reading	Applies/Understands technical words that pertain to subject [1.3.6] Uses written resources (books, dictionaries, directories) to obtain factual information [1.3.23]
		Thinking	Knowing how to Learn	Develops personal learning strategies—note taking, clustering related items, flash cards, etc. [4.3.2] Locates appropriate learning resources to acquire or improve knowledge and skills [4.3.3]
7.2 Describe how microbes and chemicals cause food spoilage	7.2.1 Visit a food preservation or processing plant	Foundation	Reading	Understands technical words that apply to the subject [1.3.6]
			Reasoning	Sees relationship between two or more ideas, objects, or situations [4.5.5]
			Science	Observes health codes/sanitation requirements [1.4.18]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
7.3 Describe the methods of food preservation	7.3.1 Make beef jerky using a food dehydrator	Foundation	Reading	Comprehends written information for main ideas [1.3.7]
			Science	Follows safety guidelines [1.4.16]
		Personal Management	Responsibility	Applies scientific principles related to food preservation [1.4.5] Exhibits enthusiasm in approaching and completing tasks [3.4.3] Exerts a high level of effort and perseverance toward goal attainment [3.4.4] Pays close attention to details [3.4.8]
7.4 Describe the effects of pasteurization on bacteria in milk		Foundation	Science	Describes/Explains scientific principles related to pasteurization [1.4.14] Solves practical problems using scientific methods and techniques [1.4.23]
		Thinking	Problem Solving	Comprehends ideas and concepts related to pasteurization [4.4.1] Recognizes/Defines problem [4.4.8]

CAREER AND TECHNICAL SKILLS What the Student Should Be Able to Do		ACADEMIC AND WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
7.5 Describe how yogurt and cheese are produced	7.5.1 Make yogurt	Foundation	Science	Applies knowledge to complete a practical task [1.4.3] Measures dry and liquid supplies [1.4.17] Uses equipment and techniques involved in making yogurt [1.4.24]
		Interpersonal	Teamwork	Contributes to group with ideas, suggestions, and effort [2.6.2] Works effectively with others to reach a common goal [2.6.6]

Glossary

Unit 1: Biological Sciences in Our Lives

1. Biological engineering—technology concerning the application of biological and engineering techniques to microorganisms, plants, and animals; sometimes used in the narrower sense of genetic engineering

Unit 2: Conducting & Reporting Experiments

1. Conclusion—a specific statement about the relationship between variables
2. Control group—In a scientific experiment, a group of animals, plants, etc., that do not receive the treatment under study
3. Dependent variable—the variable that is measured to determine the effects of the independent variable
4. Experiment—a set of procedures used to gather information
5. Findings—actual data generated from an experiment
6. Hypothesis—a tentatively accepted theory that explains the relationship between two variables
7. Independent variable—the variable in an experiment that is manipulated
8. Manipulation—management of the independent variable in an experiment
9. Procedure—a detailed and complete description of how the experiment is conducted
10. Recommendation—suggestions on how results should be used; suggestions for further experimentation
11. Replication—exact duplication of an experiment
12. Treatment—the manipulation of an independent variable

Unit 3: Genetics & Heritability

1. Allele—matching genes on homologous chromosomes
2. Chromosome—that part of a cell that contains information about genetic makeup and transmits that information to offspring
3. DNA—deoxyribonucleic acid; forms the basic material in the chromosomes of the cell nucleus
4. Dominant—relating to one of a pair of allelic hereditary factors that dominates the other and appears in the organism
5. Gamete—the sex cell; either an egg or a sperm
6. Gene—a unit of inheritance that is composed of DNA
7. Genetics—the study of heredity in plants and animals
8. Genotype—the genetic makeup of an organism; allele composition
9. Heterozygous—having different alleles for a single trait, and therefore producing two or more different kinds of gametes
10. Homozygous—having identical alleles at one or more loci, and therefore producing identical gametes
11. Phenotype—the physical appearance of an organism
12. Recessive—an allele that is not expressed phenotypically when present in the heterozygous condition

Unit 4: Animal Reproduction

1. Copulation—the mating of a male and female
2. Corpus luteum—a reddish-yellow mass that forms in a ruptured follicle in the ovary of mammals; the hormone progesterone is released by the corpus luteum
3. Embryo transfer—moving an embryo from one animal to another
4. Estrogen—a hormone produced by the ovaries
5. Estrus—the time during which the female will accept the male for copulation; also referred to as being “in heat”
6. Follicle—a small blister-like development on the surface of the ovary that contains the developing ovum
7. Follicle stimulating hormone—a hormone, produced by the pituitary gland, that promotes growth of ovarian follicles in the female and sperm in the male
8. Gestation—the time during which the animal is pregnant
9. Hormone—an organic material given off by a body gland that helps to regulate body functions
10. Hybridization—the production of hybrids by natural crossing or by manipulated crossing
11. Inbreeding—the mating of closely related animals
12. Ovulation—the release of the egg from the ovary
13. Oxytocin—a hormone that causes contractions of the uterus during breeding and parturition and causes milk letdown
14. Parturition—the act of giving birth
15. Progesterone—a hormone produced by the ovaries that maintains pregnancy in the animal
16. Selective breeding—the breeding of selected animals chosen because of certain desirable qualities or fitness
17. Super ovulation—the stimulation of more than the usual number of ovulations during a single estrous cycle due to the injection of certain hormones
18. Testosterone—a male hormone that controls the traits of the male animal

19. Zygote—a cell formed by the union of two gametes

Unit 5: Digestion & Nutrition

1. Anthelmintic—a chemical compound used for treating internal worms in animals
2. Antimicrobial—a substance that can destroy or inhibit the growth of microorganisms
3. Carbohydrates—organic compounds containing carbon, hydrogen, and oxygen
4. Cud—in ruminants, a ball-like mass of feed that is brought up from the stomach to be re-chewed
5. Finishing—the increased feeding of an animal just prior to butchering that results in rapid gains and increased carcass quality
6. Lactation—the period of milk secretion
7. Lipids—fats and oils made up of carbon, hydrogen, and oxygen
8. Maintenance ration—the amount of feed needed to support an animal when it is not doing work, yielding no product, and gaining no weight
9. Mineral—an inorganic substance needed in small amounts for proper nutrition
10. Monogastric—refers to an animal that only has one stomach or stomach compartment
11. Nonruminant—an animal that has a simple, one-compartment stomach
12. Nutrient—a chemical element or compound that aids in the support of life
13. Protein—an organic compound made up of amino acids and containing carbon, hydrogen, and nitrogen
14. Ration—the total amount of feed that an animal is allowed during a 24-hour period
15. Regurgitation—to return undigested food from the stomach to the mouth, as by ruminants
16. Ruminant—an animal that has a stomach divided into several compartments
17. Rumination—the process of digestion in cattle whereby food is swallowed to the first stomach, the rumen, and then regurgitated into the mouth and chewed over again to be swallowed for further processing by the second, third, and fourth stomachs
18. Vitamin—an organic compound needed in small amounts for nutrition

Unit 6: Animal Health

1. Active Immunity—the type of immunity in an animal that is permanent
2. Antibiotic—a chemical agent that prevents the growth of a germ or bacteria
3. Bacteria—one-celled microorganisms
4. Colostrum—the milk produced the first few days after parturition
5. Disinfectant—a chemical that destroys microbes by breaking down cell proteins
6. Infectious disease—a disease that is contagious
7. Intradermal—injections placed in the skin tissue
8. Intramammary—injections placed in the mammary glands
9. Intramuscular—injections placed in the muscle tissue
10. Intrarumenally—injections placed in the rumen
11. Intravenous—injections placed in the vein
12. Isolation—to place an animal in confinement away from other animals to prevent breeding or spread of disease
13. Mastitis—an inflammation of the mammary gland, usually associated with an infection
14. Noninfectious disease—a disease that cannot be transmitted from one animal to another
15. Oral—taken in by mouth
16. Passive immunity—immunity that is temporary
17. Pathogen—a living, microscopic, disease-producing agent, such as a bacterium or a virus
18. Protozoa—a one-celled animal
19. Sanitation—the development and practical application of measures designed to maintain or restore healthful conditions

- 20. Stress—a strain, or straining condition, that may be physical, chemical, or psychological and cannot be adjusted to satisfactorily
- 21. Subcutaneous—an injection placed just under the skin but above muscle tissue
- 22. Topical—medicine that is applied to the surface of the skin
- 23. Vaccine—a substance that contains live, modified, or dead organisms or their products that is injected into an animal in an attempt to protect the host from a disease caused by that particular organism
- 24. Virus—a self-reproducing agent that is considerably smaller than a bacterium and can multiply only within the living cells of a suitable host

Unit 7: Food Preservation

1. Aerobic bacteria—organisms that grow only in the presence of oxygen
2. Anaerobic bacteria—organisms that grow without the presence of oxygen
3. California Mastitis Test (CMT)—a field test that estimates the extent of mastitis infection
4. Canning—placing food in a container and heating it to kill all microorganisms
5. Casein—a phosphoprotein that is one of the main components of milk and the basis of cheese
6. Cheese—a food product made from the solids in milk
7. Coliform bacteria—a group of bacteria that usually inhabits the intestines of animals and lives in manure and on wood
8. Curd—an acid buildup created by bacteria, consisting mostly of casein and obtained from soured milk through coagulation
9. Curing—adding substances to food to prevent spoilage; salting, smoking, pickling, etc.
10. Dehydration—the removal of 95 percent or more of the water from any substance by exposure to high temperature
11. E. coli bacteria—bacteria that normally inhabit the human colon
12. Fermentation—the processing of food by the use of yeasts, molds, or bacteria
13. Irradiation—the process of treating a food or feed with ultraviolet light to increase the Vitamin D content
14. Microbes—minute plant or animal life; some cause disease; others are beneficial
15. Mold—fungi distinguished by the formation of a network of filaments or threads or by spore masses
16. Paraffin—a thin layer of waxy material that helps seal the surface of a fruit to prevent damage to the skin
17. Pasteurization—the process of heat-treating milk to kill microbes
18. Penicillium—any of a genus of imperfect fungi growing as green mold on stale bread, ripening cheese, decaying fruit

19. Perishable—any product that is easily or quickly destroyed or made unusable or unsafe
20. Pickling—a process of food preservation that uses a solution, such as vinegar, that is too acidic for microbes to grow
21. Putrefaction—decomposition of animal or plant matter by microorganisms in the absence of oxygen
22. Raw milk—untreated milk as it comes from the cow; fresh milk
23. Refrigeration—artificial cooling that drastically reduces microbial growth of certain bacteria
24. Rennet—a coagulating extract containing the enzyme rennin; used to curdle milk, as when making cheese
25. Salmonella—a large group of bacteria, some of which cause food poisoning
26. Salting—a method of preserving food that uses salt to prevent the growth of microbes
27. Solids nonfat—the parts of a substance, not including the fat, that help it keep its form
28. Somatic cell count—a laboratory test that indicates the presence and severity of mastitis
29. Whey—the watery liquid that is separated from the curd after milk coagulation
30. Yeast—a yellowish substance composed of microscopic, unicellular fungi that induces fermentation in juices, worts, doughs
31. Yogurt—a semisolid, fermented milk product